

a DESCRIPTION

1) PHYSICAL AND USE DESCRIPTION

a) Physical

All raceways, luminaire power distribution systems, floor outlets, access panels, and luminaire switching systems as specified, complete, installed, and in use, shall be provided for this subsystem by the System Contractor as the means of Electrical Distribution.

b) Use

The delivery and distribution of Out-of-System electrical conductors to provide power to office equipment, signal and telephone devices. The delivery and switching of power to the Luminaire Subsystem. The connection of office, telephone and signal equipment to Out-of-System electrical power, in use, in the Typical Office Space.

2) SCOPE OF WORK

a) Work Included

- (1) Luminaire power distribution between the Out-of-System electrical panels in the electrical closets and the luminaires in the Typical Office Space;
- (2) Luminaire switching (single and multiple) in the Typical Office Space to provide control of the Luminaire Subsystem;
- (3) Office equipment power distribution raceway between the Out-of-System panels in electrical closets and Finished Floor Subsystem's floor outlets and Space Dividers Subsystem's electrical devices;
- (4) Signal distribution raceway between the Out-of-System panels in electrical closets and Finished Floor Subsystem's floor outlets and Space Dividers Subsystem's electrical devices;

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- (5) Telephone distribution raceway between the Out-of-System panels in telephone closets and the Finished Floor Subsystem's floor outlets;
- (6) Pull boxes, if required, conforming to the National Electrical Code;
- (7) Means of support in the FCS for all parts of this subsystem;
- (8) Connection of luminaire conductors to terminals in the Out-of-System panels as shown on the System Contract Drawings;
- (9) Electrical distribution outlets and cover plates in the Typical Office Space;
- (10) Means of access between floor outlets and electrical distribution network.

b) Work Not Included

- (1) Electrical conductors, except for the Luminaire Subsystem;
- (2) Terminal outlets except as specified;
- (3) Connection of Out-of-System panels to Electrical Distribution Subsystem, except for the Luminaire Subsystem.
- (4) All electrical equipment and wiring associated with heat and smoke detection and sprinkler operation.

3) SPECIFIED DIMENSIONS/TOLERANCES

- a) This subsystem shall fit with and connect to Out-of-System electrical distribution panels within electrical closets which will be specified by each building's A/E in conformance with the requirements of the National Electrical Code. The location of this Out-of-System electrical distribution will be indicated for each building in the System Contract Drawings.

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- b) For location of Out-of-System electrical elements and luminaire switches, see E, 7, SPACE DIVIDERS SUBSYSTEM.
- c) All electrical conductors, including signal, telephone, and audio-communication, as well as power wiring, regardless of voltage carried, shall be contained in enclosed raceways approved by Underwriters' Laboratories or raceways having passed equivalent tests in another nationally recognized testing laboratory. A raised floor will be considered as meeting the requirements of a U.L. approved enclosed raceway, provided that a separate U.L. approved enclosed metallic raceway is provided for office equipment power distribution and luminaire power distribution.
- d) The office equipment power distribution system shall be separate from the telephone distribution and signal distribution raceway systems. Separation shall conform to Articles 725 and 800 of the NEC. The telephone distribution and signal distribution raceway systems may utilize the same space. The office equipment power distribution raceway and luminaire power distribution raceways may be combined. If combined, the cross-sectional area requirements of the office equipment power distribution system shall be increased to accommodate the luminaire power distribution conductors. The additional cross-sectional area shall consist of the cross-sectional area of the luminaire conductors to be installed, multiplied by a factor of 2 1/2.
- e) All parts of this subsystem exposed to view shall have tolerances on dimensions establishing their location and position with respect to the Planning Grid and the given vertical dimensions, flatness, parallelism, plumbness, irregularity, surface characteristics, and color consistent with the aesthetic concept of the System Prototype and determined to be acceptable.

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4) TECHNICAL DESCRIPTION

a) Electrical Distribution Outlets

(1) Types

(a) Type E

Floor outlets for office equipment power distribution raceway subsystem containing a duplex power receptacle, 125 volts, 60 cycles, conforming to the Underwriters' Laboratories Standards and the National Electric Code.

(b) Type T

Floor outlets for telephones distribution raceway subsystem large enough to contain a 24-pair telephone connector and a 4-pair private telephone connector.

(c) Type S

Floor outlets for office signal distribution raceway subsystem large enough to contain a 24-pair telephone connector and a 4-pair private telephone connector.

(d) Type ET

Floor outlets containing both (a) and (b) above in one outlet.

(e) Type ES

Floor outlets containing both (a) and (c) above in one outlet.

(2) Size

Floor outlets shall have a maximum height of 3" with a maximum plan area of 8" x 10".

(3) Cover Plate

Floor outlets shall be able to be removed and replaced with a cover plate. Cover plates shall conform to the requirements specified for the Finished Floor Subsystem.

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(4) Finish

Offeror shall submit a finish coordinated with finishes of other subsystems. The finish is to be approved by the Contracting Officer.

(5) Access to Electrical Distribution System

Access shall be provided through the finished flooring to the Electrical Distribution Subsystem. Joints, seams, and cover plates shall conform to tolerances and appearance requirements of the finished floor. Access to the Electrical Distribution Subsystem shall conform to the requirements of the National Electric Code and the Underwriters' Laboratories Standards.

5) Codes and Standards

Floor outlets shall conform to the requirements of the National Electric Code and the Underwriters' Laboratories Standards.

b SUBSYSTEM ATTRIBUTES

The performance specifications include the following categories of attributes:

- a) Conditioned Air (None)
- b) Illumination
- c) Acoustics
- d) Stability/Durability
- e) Health and Safety
- f) Maintenance
- g) Planning

These are covered on the following pages.

b SUBSYSTEM ATTRIBUTES

a) attribute: CONDITIONED AIR

REQUIREMENT: None

Criteria: None

Test: None

b SUBSYSTEM ATTRIBUTES

b) attribute: ILLUMINATION

REQUIREMENT: (1) Provide power distribution to luminaires.

Criteria: (a) The Out-of-System luminaire power supply will be based on the assumption of a luminaire voltage and frequency of 277 V, 60 HZ. This subsystem shall provide power distribution to luminaire types as shown on the System Contract Drawings.

(b) This subsystem shall provide power distribution to the luminaires, grouped in areas served from Out-of-System distribution panels, as shown on the System Contract Drawings.

Test: Type - Subsystem/System Prototype
Method - Calculation/Observation
Offeror shall indicate in his Technical Proposal any modification in luminaire voltage.

REQUIREMENT: (2) Provide control of luminaires.

Criteria: This subsystem shall provide control of luminaires within the In-System control zones.

Test: Type - Subsystem/System Prototype
Method - Calculation/Observation

REQUIREMENT: (3) Provide luminaire control zoning.

Criteria: Provide luminaire control zoning as indicated on the System Contract Drawings. These control zones may be any of the following:

b SUBSYSTEM ATTRIBUTES

b) attribute: ILLUMINATION

In-System Control Zone

Any room, group of rooms, or space in the Typical Office Space controlled from the luminaire switch locations of the Space Dividers Subsystem.

Out-of-System Control Zone

Any group of rooms or spaces extending from the core controlled by Out-of-System switching located in an Out-of-System wall.

Test: Type - Subsystem/System Prototype
Method - Observation

REQUIREMENT: (4) Provide luminaire emergency zoning.

Criteria: (a) Those parts of this subsystem providing luminaire power distribution to luminaires indicated as "Emergency" on the System Contract Drawings shall not be included as luminaire control zones specified in REQUIREMENT (3) above and shall terminate at points (panels or subpanels) as indicated on the System Contract Drawings.

(b) The distribution system shall be separate from all other electrical distribution and shall comply with Article 700 of NEC.

Test: Type - Subsystem
Method - Observation

b SUBSYSTEM ATTRIBUTES

c) attribute: ACOUSTICS

REQUIREMENT: (1) Control airborne sound transmission.

Criteria: (a) This subsystem shall not impair the Speech Privacy Potential (SPP) of no less than 60 for any two zones in the open plan areas of the Typical Office Space utilizing 60" height screens.

Test: Type - System Prototype/System Field
Method - PBS-C.1

Criteria: (b) This subsystem shall be deemed to meet Criterion (a) above if the sum of the speech privacy Noise Isolation Class (NIC') and a compatible NC-Background not exceeding 40 is no less than 60.

Test: Type - System Prototype/System Field
Method - PBS-C.2

Criteria: (c) This subsystem shall not impair the Speech Privacy Potential (SPP) of no less than 70 for any two rooms in the Typical Office Space.

Test: Type - System Prototype/System Field
Method - PBS-C.1

Criteria: (d) This subsystem shall be deemed to meet Criterion (c) above if the sum of the speech privacy Noise Isolation Class (NIC') and a compatible NC-Background not exceeding 35 shall be no less than 70.

Test: Type - System Prototype/System Field
Method - PBS-C.2

REQUIREMENT: (2) Control impact sound transmission.

Criteria: Footstep sounds transmitted to rooms located directly below shall be masked by an NC-Background not greater than 40. The system

b SUBSYSTEM ATTRIBUTES

c) attribute: ACOUSTICS

shall have the capability of masking footfall sounds transmitted to rooms located directly below with an NC-Background of not greater than 35.

Test: Type - System Prototype/System Field
Method - Physical/Impact Sound Transmission
Test by Footfall Method, IBI-1-I, 1965
Modification - Offeror shall propose modifications to test method for prototype and field application in his Technical Proposal; use male walker with metal-tipped heels in addition to specified female walker.

REQUIREMENT: (3) Control sound generation.

Criteria: The measured sound pressure levels produced or transmitted by this subsystem in use, when combined with the measured sound pressure levels produced or transmitted by all other subsystems in use, shall be not greater than those defined by an NC-Background equal to 35. All pure tones shall be at least 5 decibels below the sound pressure level otherwise produced or transmitted by the system at the corresponding frequency band.

Test: Type - System Prototype/System Field
Method - Physical/Calculation/Measurement of Sound
Reference - USAS S1.2-1962 and ASHRAE Handbook, Systems, Latest Edition, Chapter 35.

b SUBSYSTEM ATTRIBUTES

d) attribute: STABILITY/DURABILITY

REQUIREMENT: (1) Provide subsystem support.

Criteria: This subsystem shall be supported in the FCS with a factor of safety of 5 against the dead load of this subsystem and any other subsystem supported by this subsystem.

Test: Type - Subsystem
Method - Calculation/Structural Analysis

REQUIREMENT: (2) Provide resistance to earthquake loads.

Criteria: (a) No part of this subsystem or any other subsystem supported by this subsystem shall separate from its supports, fail, or cause failure in a manner that will endanger occupants when subjected to seismic forces as specified in GSA Handbook, "Structural Engineering," and when located in Zones 2 and 3 to vertical accelerations equal to one-half that of gravity.

(b) This subsystem, in addition to resisting the seismic forces as specified above in the Project Buildings, shall be capable of resisting seismic forces similarly at any location in the 50 states as specified in the above handbook.

Test: Type - Subsystem
Method - Calculation/Structural Analysis

REQUIREMENT: (3) Control water absorption.

Criteria: No part of this subsystem exposed to the FCS in use shall absorb water.

b SUBSYSTEM ATTRIBUTES

d) attribute: STABILITY/DURABILITY

Test: Type - Subsystem
Method - Physical/Water Absorption of
Plastics, Fed. Test Method Std. No. 406,
Method 7031
Modification - Use procedure A; test specimens
shall be of a size, shape, and preparation
representative of the subsystem in use.

REQUIREMENT: (4) Control water retention.

Criteria: The external surface configuration of all
parts of this subsystem in use shall not be
capable of containing water.

Test: Type - Subsystem
Method - Observation

REQUIREMENT: (5) Provide resistance to loads.

Criteria: Non-flush floor outlets shall resist a
horizontal load of 150 pounds with a physical
displacement of not more than 1/16" and
without any damage to outlets or to adjoining
parts of this or other subsystems.

Test: Type - System Prototype
Method - A wire loop shall be placed around a
door stop or a non-flush floor outlet in the
prototype. This wire will have a spring scale
(calibrated to 200 pounds) installed 2' from
the loop and shall extend an additional 5'-0"
to a wooden handle in a direction horizontal
from the test specimen. The test specimen
shall show no damage as a result of this test.
Repeat this test four times rotating the loop
(and direction of the applied force) 90
degrees each time.

b SUBSYSTEM ATTRIBUTES

d) attribute: STABILITY/DURABILITY

REQUIREMENT: (6) Provide floor outlet
stability/durability attributes.

Criteria: This subsystem's floor outlets and cover plates shall conform to the requirements of E, 5A, STABILITY/DURABILITY.

Test: Type and Method as specified in E, 5A, STABILITY/DURABILITY.

b SUBSYSTEM ATTRIBUTES

e) attribute: HEALTH AND SAFETY

REQUIREMENT: (1) Control electrical safety.

Criteria: This subsystem shall have a continuous grounding in accordance with the National Electrical Code.

Test: Type - Subsystem
Method - Observation
Reference - National Electrical Code.

REQUIREMENT: (2) Provide electrical safety.

Criteria: This subsystem's switching devices and floor outlets shall conform to NEC and be U.L. listed and labeled as "Specification Grade Devices."

Test: Observation

REQUIREMENT: (3) Provide fire safety.

Criteria: The temperature rise of the surface of this subsystem's floor outlets shall meet the criteria specified for the fire safety requirements of the Structure Subsystem.

Test: Type - System
Method - ASTM E 119, Fire Tests of Building Construction and Materials

b SUBSYSTEM ATTRIBUTES

f) attribute: MAINTENANCE

REQUIREMENT: Provide floor outlet
maintenance attributes.

Criteria: This subsystem's floor outlets and cover
plates shall conform to the requirements of
E, 5A, MAINTENANCE.

Test: Type and method as specified in
E, 5A, MAINTENANCE.

b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

REQUIREMENT: (1) Control location of floor outlets and
Electrical Distribution access panels.

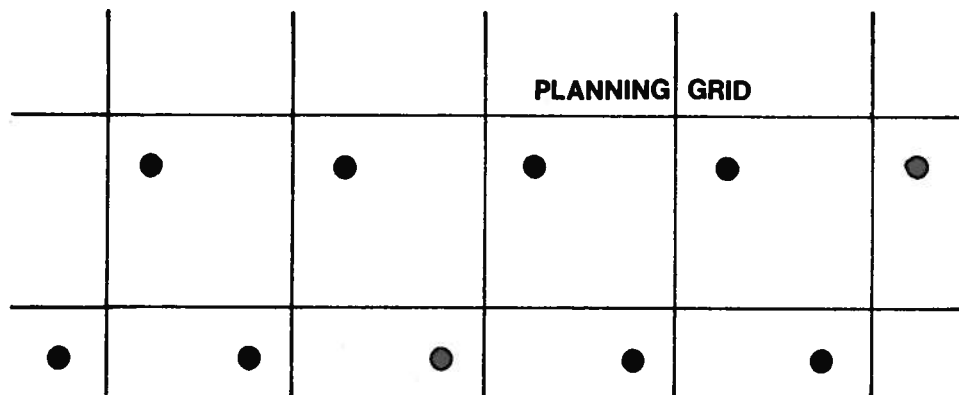
Criteria: (a) Floor outlets shall be able to be located at any intersection of the lines of a staggered grid 60" x 60" parallel to and not congruent with the Planning Grid and the 30" partition grid.

(b) Floor outlets and electrical distribution access panels, if applicable, shall be usable at any of their specified locations and shall not interfere with or be interfered with by Space Dividers Subsystem partitions located anywhere on the 30" partition grid and shall not impair the specified performance of the partitions.

(c) Floor outlets shall have a regular geometric relationship to the Planning Grid.

(d) Floor outlets shall have a regular geometric relationship to perceived patterns of the Finished Floor Subsystem, if applicable.

Test: Type - Subsystem
Method - Observation



b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

REQUIREMENT: (2) Provide wiring capacity for
office equipment power distribution.

Criteria: (a) This subsystem shall provide office equipment power distribution raceway with a cumulative free cross-sectional area of 1 square inch per 1000 square feet of Typical Office Space served with a minimum size of equivalent performance to 3/4" I.D. raceway.

(b) This subsystem shall provide office equipment power distribution raceway terminating in the electrical closets as indicated on the System Contract Drawings.

(c) This subsystem shall provide connection between the distribution system and the Out-of-System electrical equipment in the Space Dividers Subsystem.

Test: Type - Subsystem/System Prototype
Method - Calculation/Observation

REQUIREMENT: (3) Provide wiring capacity for
signal distribution.

Criteria: (a) This subsystem shall provide signal distribution raceway with a cumulative cross-sectional area of 1 square inch per 500 square feet of the Typical Office Space served with a minimum size of equivalent performance to 3/4" I.D. raceway.

(b) This subsystem shall provide signal distribution raceway terminating in the electrical closets as indicated on the System Contract Drawings.

(c) This subsystem shall provide connection between the distribution system and the Out-of-System electrical equipment in the Space Dividers Subsystem.

b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

Test: Type - Subsystem/System Prototype
Method - Calculation/Observation

REQUIREMENT: (4) Provide wiring capacity for telephone distribution.

Criteria: (a) This subsystem shall provide telephone raceway with a cumulative free cross-sectional area of 1 square inch per 100 square feet of Typical Office Space served with a minimum size of equivalent performance to 1 1/4" I.D. raceway.

(b) This subsystem shall provide telephone raceway terminating at points as indicated on the System Contract Drawings.

REQUIREMENT: (5) Provide wiring capacity for luminaire power distribution.

Criteria: The subsystem installed shall have the capacity to provide for a uniform distribution of the luminaires throughout the Typical Office Space of the type requiring the greatest wiring quantity.

Test: Type - Subsystem/System Prototype
Method - Calculation/Observation

REQUIREMENT: (6) Provide for planning change.

Criteria: (a) A planning change involving the installation or removal of Out-of-System electrical conductors in this subsystem shall not require access to pullboxes, if applicable, at more than 3 locations in the Typical Office Space.

b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

Test: Type - Subsystem/System Field
Method - Observation

Criteria: (b) Change in any part of this subsystem shall not in itself impair the performance and integrity of any other subsystem.

Test: Type - System Prototype/System Field
Method - Observation

Criteria: (c) This subsystem's office equipment signal and telephone distribution raceway shall be installed such that access to it for the installation of floor outlets can be achieved within 15 minutes from the time all supplies and equipment are available and set up at the work site until the system is ready for the pulling of Out-of-System electrical conductors.

Test: Type - System Prototype
Method - Observation

Criteria: (d) Floor outlets, door stops and electrical distribution access panels, if applicable, shall be installed so as to allow each of the following to be done by 1 man in no more than 5 minutes:

Remove floor outlet and replace with another;
Remove floor outlet and replace with a flush cover plate;
Remove and reinstall electrical distribution access panel.

Test: Type - System Prototype
Method - Observation

b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

REQUIREMENT: (7) Control relation to the Planning Grid.

Criteria: Those parts of this subsystem exposed to view shall have a regular geometric relationship to the Planning Grid.

Test: Type - System Prototype/System Field
Method - Observation

REQUIREMENT: (8) Control tolerances.

Criteria: All parts of this subsystem exposed to view shall have tolerances on dimensions establishing their location and position with respect to the Planning Grid and the given vertical dimensions, flatness, parallelism, plumbness, irregularity, surface characteristics, and color consistent with the aesthetic concept of the system's design, and which shall not exceed those measured in the System Prototype and determined to be acceptable.

Test: Type - System Prototype/System Field
Method - Observation

REQUIREMENT: (9) Control pulling distance.

Criteria: (a) This subsystem's office equipment power distribution raceway and signal distribution raceway shall be arranged such that the maximum installed length of Out-of-System conductors does not exceed 200'.

(b) This subsystem's telephones raceway shall be arranged such that the maximum installed length of Out-of-System conductors does not exceed 150'.

b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

(c) Distances shall be measured from the point of termination at the Core Interface Boundary to the furthest possible location in the Typical Office Space. Cumulative cross-sectional areas specified for these systems shall be based on the maximum area served by the foregoing.

Test: Type - Subsystem
Method - Calculation/Observation

REQUIREMENT: (10) Control interconnection of distribution system.

Criteria: (a) This subsystem's office equipment power distribution raceway, signal distribution raceway, and telephone raceway shall be arranged so that the Out-of-System conductors may be installed from any termination point at distribution panels to any floor outlet in the specified contiguous Typical Office Space. This requirement shall not be subject to the maximum pulling distances specified in REQUIREMENT (9) above and shall not be included in the cumulative area requirements specified in REQUIREMENTS (2), (3), and (4), above. If raceways other than those required above are necessary to provide the interconnection specified herein, the minimum size of raceway shall be as specified in REQUIREMENTS (2), (3), and (4), above.

Test: Type - Subsystem
Method - Observation

Criteria: (b) This subsystem's luminaire power distribution raceway shall be arranged such that In-System conductors may be installed from any termination point at distribution panels to any luminaire in the contiguous Typical Office Space specified.

b SUBSYSTEM ATTRIBUTES

g) attribute: PLANNING

Test: Type - Subsystem
Method - Observation

REQUIREMENT: (11) Provide interchangeability.

Criteria: (a) Floor outlets and electrical distribution access panels, if applicable, shall be installed so as to allow each of the following to be done by one man in no more than five minutes:

Remove floor outlet and replace with another;

Remove floor outlet and replace with a flush cover plate;

Remove and reinstall electrical distribution access panel.

Test Type - Subsystem
Method - Observation

